Remarks

I. Objections

A. The Specification

Page 2 of the Final Rejection notes some informalities in the specification with regard to reference element numbering.

In response, applicant has amended paragraph [0060] to replace "gate electrode 215" with "gate electrode 225."

Applicant has amended paragraph [0065] to replace "wires 342 and 344," with "wires 357 and 366."

Applicant has also amended paragraph [0067] to label one "major surface" of the "wafer substrate" with the reference numeral "401" and to label another "major surface" of the "wafer substrate" with the reference numeral "402."

Similarly, applicant has amended paragraph [0068] to label "opposite surface" with reference numeral "402."

B. The Drawings

The Final Rejection beginning on page 2 also notes some informalities in the drawings. Applicant respectfully asserts that the amendment to paragraph [0065] mentioned above has overcome the objection to reference designators 342 and 344.

A replacement for sheet number seven of the drawings, labeled "Replacement Sheet 7/14," is also submitted herewith, which has been amended to contain in FIG. 19 reference numeral 360.

A replacement for sheet number eight of the drawings, labeled "Replacement Sheet 8/14," is also submitted herewith, which has been amended to contain in FIG. 20 reference numerals 401 and 402, with reference numeral 401 pointing to a dashed line indicating one major surface of the wafer substrate, and reference numeral 402 pointing to another major surface of the wafer substrate, as described for example in paragraph [0067] the specification. No new matter has been added.

Applicant respectfully disagrees with several aspects of the Examiner's reasoning in this objection, as discussed below, but offers this amendment to FIG. 20 in an effort to

expedite the already extended prosecution of this application. In short, applicant respectfully but strongly disagrees with the Final Rejection allegation that the application as originally filed has insufficient support for the limitation "wherein no part of said substrate is disposed further than said transducer from said actuator."

As discussed and depicted in various parts of the application and drawings, a transducer can be formed atop a major surface of a wafer substrate after an actuator has been formed atop the opposite major surface of the substrate, so that "no part of said substrate is disposed further than said transducer from said actuator." For example, the "SUMMARY OF THE INVENTION" on page 4 states, in part:

> In accordance with the present invention integrated head, flexure, gimbal and/or actuator devices formed on and from a wafer substrate are disclosed. Conventional problems of connecting the head to the flexure and/or gimbal are reduced or eliminated, as all of these elements may be made on and from the same wafer on which the transducer is formed... Additionally, ***a microactuator may be formed on an end of the structure furthest from the transducer layers***. (emphasis added)

More detailed explanations of the formation and operation of an actuator on an opposite side of a substrate from a transducer can be found in paragraphs [0067]-[0069], [0072]-[0076] and [0078]-[0082]. For instance, original paragraph [0067] states, in part:

> FIG. 20 shows a device 400 including a piezoelectric layer 404 that may be employed to help position the device. Much of device 400 is like device 30 shown in FIG. 1, and so for brevity substantially similar elements will not be renumbered or discussed at this point. Much as above, device 400 is formed on and from a wafer substrate, but prior to formation of head elements on a major surface of the wafer, a conductive layer 408 is formed on a major surface of the wafer. The conductive layer 408 may be formed of a metal or conductive ceramic that adheres well to the wafer and to the piezoelectric layer 404 that is formed atop the conductive layer...

Applicant respectfully asserts that one of ordinary skill in the art would understand what a major surface of a wafer substrate is, and would understand from FIG. 20 that the head elements are formed atop an opposite major surface from the "piezoelectric layer 404 that is formed atop the conductive layer." Moreover, FIG. 3 explicitly depicts an embodiment of "head 33" in which "tranducers 40 and 44" are formed in multiple layers atop the "wafer substrate 100." See paragraphs [0045] –

[0047]. Applicant respectfully asserts that one of ordinary skill in the art would not view FIG. 20 in isolation, especially because the text quoted above references earlier portions of the application, but states that "for brevity substantially similar elements will not be renumbered or discussed at this point."

The Final Rejection, however, ignores the remainder of the application to instead focus only on FIG. 1, which depicts transducer layers disposed atop a wafer substrate, albeit with less detail than the example shown in FIG. 3, and does not depict an actuator formed on an opposite end of the substrate, unlike FIG. 20. In this regard, the Final Rejection on page 3 states:

> FIG. 1 clearly shows wherein the head (33) and substrate layer and the rear portion of pad (50) itself, ***extend beyond*** the transducer layers (40) and (44). That is, the transducer layers appear to be formed on and within the substrate.

The Final Rejection thus focuses on particular elements that may be called a "substrate" in a given context to argue that those elements "***extend beyond*** the transducer layers (40)," while choosing to ignore the text and drawings that provide support for the limitation "wherein no part of said substrate is disposed further than said transducer from said actuator."

In addition to choosing to ignore the teachings of the present application, the Examiner also chooses to ignore the teachings of several patents that he has recently issued as the Primary Examiner. For example, U.S. Patent No. 6,842,317 states, in column 11, lines 28-54:

> In the ***MR element shown in FIG. 9, a lower electrode 503, a MR element 505 and an upper electrode 502 are laminated on a substrate 504*** in this stated order....
>
> FIG. 10 shows one example of a ***magnetic head utilizing the MR element*** of the present invention. (emphasis added)

As another example, U.S. Patent No. 6,657,827 states, in column 3, lines 14-24:

> FIG. 1 shows a bottom view of a ***head 1*** according to a first embodiment of the present invention. The ***head 1 includes a head chip 2 having an MR element. The head chip 2 includes first and second external connection electrodes 2a and 2b*** for establishing connection with an external circuit. In this embodiments, though the MR element is used as the head chip 2, another reading-writing element, such as a magneto-optical reading-writing element, can be used.

The ***head chip 2 is mounted on a substrate*** 3. (emphasis added)

In brief, the Final Rejection's argument regarding a "substrate" and "transducer layers," while reasonable in some situations, ignores explicit teachings of the present application as well as ignoring many recent patents the Examiner has issued, in order to allege that the application is somehow deficient. Building upon and extending this flawed reasoning, the Final Rejection on page 3 states:

> If there is no new matter, the Applicant must present all such FIGs analogous to FIG. 1 clearly and unambiguously disclosing that the substrate can have no portion beyond the layer (44) (e.g., showing layers (44 and (44) formed on a dotted line, wherein the dotted line indicates the end of the substrate with the transducers layers formed within a protection layer.

Applicant is unaware of any requirement in U.S. patent law to update all "analogous" figures to show a limitation recited in a dependent claim. Indeed, applicant is unaware of any requirement that all the limitations of a claim be depicted in a single drawing, as the Final Rejection is apparently requiring of applicant despite the original application teaching in various places the limitation "wherein no part of said substrate is disposed further than said transducer from said actuator," as discussed above. Although the original application clearly provides adequate support for this limitation to one of ordinary skill in the art, applicant has added a dotted line 401 to FIG. 20 to indicate a major surface of the substrate as described in original paragraph [0067].

The Final Rejection continues with questions that would make little sense to one of ordinary skill in the art, stating on page 3:

> How this affects lead layer (56-59) is, however, unclear. Are these layers (56-59) to be also within the protective layer formed on the substrate? This would seem to be ***inconsistent*** with applicants own disclosure in paragraph [0044], wherein it is specifically stated "leads 56, 57, 58 and 59 [are] disposed ***in*** gimbal elements 35."

A brief review of the application reveals no inconsistency in describing that the "lead layers (56-59)" are formed atop the substrate along with the transducer layers, and are also located within the "protective coating 127" as described in paragraph [0047]. In fact, the sentence in paragraph [0044] immediately following that quoted by the Final Rejection states:

As will be explained in more detail below, ***transducer leads 56, 57, 58 and 59 can be defined during formation of transducers on a wafer*** to provide guidance during row bar processing for the formation of gimbals 35 and flexures 38 of a desired thickness. (emphasis added)

No inconsistency is found in paragraph [0048], which in part states:

FIG. 5 shows row 140 cut from the ***substrate 100***, with the recently formed inductive transducer 40 and ***leads 56 and 58 visible through the transparent protective coating***. (emphasis added)

Paragraphs [0050] and [0051] then describe the use of conductors 56-59 as etch stops that can help define the thickness of the gimbals, again consistent with all other descriptions and drawings. In short, applicant cannot find the inconsistency to which the Final Rejection alludes, and respectfully requests an understandable explanation if the Examiner actually believes that there is such an inconsistency after reading the application.

C. The Claims

The Final Rejection on page 4 objects to claim 25, stating:

With regard to claim 25 (line 3), the word --piece-- should be inserted after the word "substrate" for claim consistency.

Applicant has amended claim 25 in the manner suggested by the Examiner.

II. Claim Rejections

A. 35 U.S.C. §112, ¶ 2

The Final Rejection on page 4 states:

Claims 23, 26 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter which applicant regards as the invention.

As per newly presented claims 23, 26 and 29, the phrase "wherein ***no part*** of said substrate is disposed further than said transducer from said actuator" (emphasis added) is misdescriptive to the disclosed invention, and thus ambiguous. More concretely as is shown in FIG. 1, the head (33) includes portions that are located laterally and beyond/above (in terms of the positive x direction) the transducing elements within pad (50); as noted in Figure 1 of Applicant's disclosure, the upper plane of head substrate (33) clearly and unambiguously lies "above" the transducer layers (40) and (44), albeit slightly so.

Applicant respectfully but strongly disagrees with the Examiner's allegation that "the phrase 'wherein ***no part*** of said substrate is disposed further than said transducer from said actuator' is misdescriptive to the disclosed invention, and thus ambiguous." As noted above with regard to the objection to the drawings, ample support is found for this limitation in the original application and drawings. Also as noted above, the Final Rejection focuses on a particular element that may be called a "substrate" in a particular situation, to argue that this element "includes portions that are located laterally and beyond/above ... the transducing elements within pad (50)," while choosing to ignore the text and drawings that provide support for the limitation "wherein no part of said substrate is disposed further than said transducer from said actuator."

The Examiner's rejection of claims 23, 26 and 29 hinges upon his statement that "head substrate (33) clearly and unambiguously lies 'above' the transducer layers (40) and (44), albeit slightly so." To make this rejection, the Examiner also chooses to ignore the teaching of many patents that he has issued, some of which were mentioned above.

For this reason also, the rejection of claims 23, 26 and 29 under 35 U.S.C. §112, ¶ 2 grounds is improper.

B. 35 U.S.C. §112, ¶ 1

The Final Rejection on page 4 states:

> Claims 23, 26 and 29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.
>
> As set forth *supra*, as per newly presented claims 23, 26 and 29, the phrase "wherein ***no part*** of said substrate is disposed further than said transducer from said actuator" (emphasis added) is unsupported by the Applicant's originally disclosed invention.
>
> More concretely as is shown in FIG. 1, the head (33) includes portions that are located laterally and beyond/above (in terms of the positive x direction) the transducing elements within pad (50); as noted in Figure 1 of Applicant's disclosure, the upper plane of head substrate (33) clearly and unambiguously lies "above" the transducer layers (40) and (44), albeit slightly so.

> Moreover still the Applicant's original disclosure is completely silent with respect to "wherein no part of said substrate is disposed further than said transducer from said actuator" other than the Applicant's drawings, which are ambiguous at best in terms of this critical limitation.

Applicant respectfully but strongly disagrees with the Examiner's allegation that "Applicant's original disclosure is completely silent with respect to 'wherein no part of said substrate is disposed further than said transducer from said actuator' other than the Applicant's drawings, which are ambiguous at best in terms of this critical limitation." As noted above, the original "SUMMARY OF THE INVENTION" on page 4 states, in part:

> In accordance with the present invention integrated head, flexure, gimbal and/or actuator devices formed on and from a wafer substrate are disclosed. Conventional problems of connecting the head to the flexure and/or gimbal are reduced or eliminated, as all of these elements may be made on and from the same wafer on which the transducer is formed... Additionally, ***a microactuator may be formed on an end of the structure furthest from the transducer layers***. (emphasis added)

Moreover, FIG. 1, FIG. 3, FIG. 20, FIG. 23 and FIG. 24, as well as corresponding descriptions in paragraphs [0040], [0044]-[0047], [0067]-[0069], [0072]-[0076] and [0078]-[0082] all provide support for this limitation, as discussed above. While the Examiner is free to provide a plausible interpretation of one figure of the drawings, he is not free to ignore the remainder of the specification and drawings to assert that the original application does not support claims 23, 26 and 29. For all these reasons, applicant respectfully but strongly asserts that claims 23, 26 and 29 satisfy 35 U.S.C. §112, ¶ 1.

Although the alleged obviousness of the claims is discussed below under the heading of 35 U.S.C. §103, it is interesting to note at this point that an indication of nonobviousness is evident from the Final Rejection's Section 112 rejections. That is, even an Examiner who has issued well over one thousand patents in this area has such difficulty imagining the formation of a transducer on one side of a substrate and an actuator on an opposite side that he ignores the teaching of the specification and drawings to arrive at an interpretation he better understands.

C. 35 U.S.C. §102

1. The Alleged Anticipation of Claims 1, 7-10, 20-22, 27 and 28 by Harada et al.

The Final rejection rejects claims 1, 7-10, 20-22, 27 and 28 under 35 U.S.C. §102(b) as being anticipated by Japanese Published Application No. 09-035230 to Harada et al. ("Harada"). The Final rejection states:

> As per claims 1 and 20, Harada et al. (JP 035230 A) discloses a device for reading or writing information (see FIG. 1 – disk drive), the device comprising: an electromagnetic transducer (magnetic head 1, which includes electromagnetic transducing element – solid layers of an electromagnetic induction element 11 and magnetoresistive element 12 – see paragraph [0029] of previously enclosed English machine translation) including a plurality of solid transducer layers of the induction head (11) and/or the layers of the magnetoresistive head (12), a substrate (e.g., slider (2) and unitary integral flexures (3,3)) adjoining said transducer (1), said substrate (2,3) shaped as a rigid body (slider portion which directly adjoins the transducer (1)) adjacent to said transducer (1) and as a plurality of flexible elements (3) distal to said transducer (1) (e.g., see FIGS. 3, 4 and 5), and an actuator – actuation means as per claim 20 (e.g., portion of load arm between elements (7) which magnetically interacts with (7) to rotationally position the slider (2) to a selected track of the disk (6)) attached (i.e., fastened, or secured or joined to) to said substrate (2 including flexing elements (3)) distal to said transducer (1) (via (4) and/or (5)). Note the Examiner has interpreted the term "attached" as encompassing non-direct contact. For example, two objects can be considered as being "attached" (or for that matter "joined" or "secured" or "fastened") to each other by an intervening element, such as resin or glue bonding the two objects together, without requiring direct contact between the two objects.

a. Harada is Nonenabled

As an initial matter, applicant objects to Harada as being nonenabled. To invalidate a claim for anticipation or obviousness, a prior art reference must be enabling. "That prior art patents may have described failed attempts or attempts that used different elements is not enough. The prior art must be enabling. *See Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 1471, 43 USPQ 2d 1481, 1489 (Fed. Cir. 1997) ("In order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method." (*quoting Beckman Instruments, Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551, 13 USPQ 2d 1301, 1304 (Fed. Cir. 1989)))."

Rockwell Int'l Corp. v. United States, 147 F.3d 1358, 1365 (Fed. Cir.1998). See also *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1558 (Fed. Cir. 1985), which states: "The 'failed' experiment reported in the prosecution history of the Mason patent renders that patent irrelevant as a prior art reference. As stated by Judge Learned Hand, 'another's experiment, imperfect and never perfected will not serve either as an anticipation or as part of the prior art, for it has not served to enrich it.' *Picard v. United Aircraft Corp.*, 128 F.2d 632, 635 (2d Cir. 1942), *cert. denied*, 317 U.S. 651, 87 L. Ed. 524, 63 S. Ct. 46, (1942)."

Harada notes that: "This document has been translated by computer. So the translation may not reflect the original precisely." More to the point, the "English machine translation" of Harada is in many places impossible to understand and/or absurd. Whether this is due to poor translation or deficiencies and contradictions in the original document is unclear. What is clear, however, is that Harada's description and drawings would not enable one of ordinary skill in the art to make and use the invention claimed by Harada, and would be further removed from enabling one of such skill to make and use the claims at issue.

For example, Harada states in paragraphs [0020] and [0028], respectively, that "said junction " and "electrical wiring 4" "defecates the front face of the field joined by the inactive atom or ion beam etching in a vacuum or a clarification ambient atmosphere chamber." Harada further states in paragraph [0021] "an erector with a gimbal can install the minute magnetic head and the minute slider section at the tip of a magnetic-head support means more nearly nothing." Similarly, paragraphs [0014] – [0018] of Harada each state: "the magnetic head of the shape of a thin film installed so that it might become abbreviation parallel to a magnetic-recording medium, The pneumatic bearing formed as supported said magnetic head and projected toward the magnetic-recording medium (slider), The electric wiring which outputs and inputs an electrical signal to the magnetic head, It has the magnetic-head slider, the electric wiring, and the arm unification magnetic-head support means which really formed the metal supporter material (arm) which determines the relative position to the magnetic-recording medium of the magnetic head, and constituted it from a single crystal silicon substrate of the same material." Although Harada abounds with further examples of curious or absurd

statements, suffice it to say that nearly every paragraph if not every sentence of that reference contains statements whose meaning would have been unclear to one of ordinary skill in the art.

Moreover, much of that which is discernable from Harada is self contradictory. For example, Harada teaches in paragraph [0031] of "..contact hole 21 punched by penetrating a slider 2 from there..." One would expect that "contact hole 21" could not be punched with head 1 attached. Yet Harada does not indicate how to make thin film "magnetic head 1," which according to paragraph [0029], "the dimension of the thickness direction was expanded and exaggerated" in drawing 3, or how to join those delicate thin films to "slider 2." For example, Harada does not disclose what adhesive would be used for that joining, and how could that adhesive allow electrical conduction between "contact hole 21" and "electrode terminal 13" without also providing electrical conduction between all four of the leads ("Electric wiring 4") shown in drawing 4. If instead heat and/or an applied electric field were to be used to join the "magnetic head 1" to "slider 2," one of ordinary skill in the art would expect that the thin films of the head would be destroyed.

Other contradictions of Harada are also facially evident. For instance, in paragraph [0025] Harada states: "A magnetic-head support device consists of the gimbal 3, the electric wiring 4, and the arm 5 for holding the magnetic head 1, a slider 2, and its posture, and from the magnetic head 1 to the electric wiring 4 is fabricated by the solid configuration with a micro processing technique from a silicon single crystal substrate. On the other hand, in order for appearance processing of the arm 5 to be carried out by photoetching processing which used the metal and to raise flexural rigidity, a part of side edge section to a longitudinal direction is fabricated by bending." How is it possible that "from the magnetic head 1 to the electric wiring 4 is fabricated by the solid configuration with a micro processing technique from a silicon single crystal substrate"? Moreover, it is not possible to reconcile drawing 2 with drawings 4 and 5, although each is said by Harada to represent the same "1st example." For example, the "sectional view" of drawing 2 shows "gimbal 3" connected to "slider 2," yet the "perspective view" of the same example in drawings 4 and 5 instead shows a space between "gimbal 3" and "slider

2," for any lengthwise cross-section that intersects "head 1." For at least these reasons Harada is nonenabled and cannot be used as prior art.

The Final Rejection on pages 17 and 18 responds to the various reasons explained above as to why Harada is nonenabled by simply claiming, albeit "vigorously," that Harada is enabled. The Final Rejection, however, offers no answer to myriad examples of Harada's generally unintelligible nature and various contradictions that were detailed by applicant in the prior response. Indeed, applicant respectfully asserts that one of ordinary skill in the art who had reviewed Harada would have been so confused by that reference that one of such skill would have been discouraged from trying anything that at all resembles Harada.

b. Harada Does Not Teach Several Limitations of the Rejected Claims

Assuming arguendo that Harada is enabled, applicant respectfully disagrees with the Final rejection statement that "paragraph [0029]" of Harada discloses "a plurality of solid transducer layers of the induction head (11) and/or the layers of the magnetoresistive head (12)." Paragraph [0029] of Harada does not describe plural layers of the magnetoresistive head (12), but rather describes drawing 3, which does not depict magnetoresistive head (12) at all.

Applicant further respectfully disagrees with the Final rejection statement that Harada discloses "an actuator... attached (i.e., fastened, or secured or joined to) to said substrate ... (via (4) and/or (5))." Drawings 3, 4 and 5 do not show an actuator. In drawings 1 and 2, "arm 5" of Harada does not extend to connect with "actuator 7." Even if, *assuming arguendo*, "arm 5" did extend to connect with "actuator 7," it is clear that "arm 5" is not connected with "substrate 2." Moreover, should "electric wiring 4" extend to connect with "actuator 7," as asserted in the Final rejection, signal errors would be expected due to the changing voltage, current and magnetic field in the actuator. Such a debilitating signal error provides yet another reason why Harada is nonenabled. In short, Harada does not disclose that "actuator 7" is attached to "substrate 2" as proposed by the Final rejection.

The Final Rejection responds on page 18 to the immediately prior paragraph (which is simply reproduced from applicant's prior response) by rewriting that paragraph, stating:

> The Applicants somehow alleges that Harada et al. (JP 9-035230 A) fails to disclose an "actuator."

Applicant also notes that the Examiner appears to be either rewriting Harada or interpreting "attached" as encompassing more than non-direct contact. That is, Harada calls element 7 an actuator, as noted by the Final Rejection on page 18, which states:

> The Examiner directs the Applicant's attention to, *inter alia*, paragraph [0024] of Harada et al. (JP 9-035230 A) and to FIG. 1, 2 and 6. ***As is clearly depicted in such Figures, the actuator is represented by designator (7).*** (emphasis added)

In addition, applicant has amended claim 1 to recite "a microactuator." Applicant respectfully asserts that Harada does not disclose such a "microactuator."

Claim 20, on the other hand, in part recites "actuation means for positioning said transducer." The Final Rejection, however, does not distinguish claim 20 from claim 1, despite the "means-plus-function" clause in claim 20. In particular, the Examiner disregards the structure disclosed in appellants' specification corresponding to the "means-plus-function" clause in claim 20 in rendering his opinion that claim 20 is not patentable. Because the Examiner does not attempt to show that the structure corresponding to the "means for" clause in claim 2 is anticipated by Harada, the Final Rejection has failed to present a *prima facie* case of anticipation of claim 20.

Moreover, claim 20 in part recites "said actuation means attached to said substrate distal to said transducer." Applicant agrees with the Examiner that, "As is clearly depicted in such Figures, the actuator is represented by designator (7)." Applicant respectfully asserts, however, that Harada does not disclose that "actuator 7" is attached to "substrate 2" as proposed by the Final rejection.

c. Claims 21, 24 and 27

Regarding claims 21, 24 and 27, the Final Rejection states:

> As per claims 21 and 27 (and also claim 24, rejected infra), wherein said flexible elements (3) extend substantially parallel to a first

> plane (e.g., the plane in which the elements (3) lie) and said transducer layers are substantially parallel to a second plane that is perpendicular to said first plane. Note that the actual "transducing" performed by the head of Harada et al. (JP 9-035230 A) is at the pole tips and fringing gap located proximate designator (113) in FIG. 3, and that these nearly vertical pole tip layers are substantially (although not quite) vertical in FIG. 3. Thus, clearly it can be said that the "transducing layers" are substantially parallel to a second plane that is perpendicular to the plane encompassing the flexures (3).

As noted above, Harada is not enabled to teach "flexible elements (3)" because it is not possible to reconcile drawings 2 and 3 with drawings 4 and 5, although each is said by Harada to represent the same "1st example." For example, the "sectional view" of drawing 3 shows "gimbal 3" connected to "slider 2," yet the "perspective view" of the same example in drawings 4 and 5 instead shows a space between "gimbal 3" and "slider 2," for any lengthwise cross-section that intersects "head 1." For at least this reason Harada is nonenabled and cannot be used as prior art to show a "flexible element 3" having any orientation relative to the "transducer layers" alleged by the Final rejection.

In addition, Harada does not teach, and it would not have been evident to one of ordinary skill in the art, how to make the "transducer layers" alleged by the Final rejection. Applicant respectfully requests the Examiner to explain, with reference to support in Harada, exactly how the unconventional "head 1" of Harada would be made. In particular, how are the layers adjacent to "gap 113" that are asserted by the Examiner to be "substantially vertical" made to terminate at the corner of "head 1" adjacent to vertical and horizontal edges of "head 1" as shown in FIG. 3? Paragraph [0030] of Harada teaches "the magnetic head of the planar method installed in parallel with the flat surface," implying that the "head 1" is built in layers that are parallel to layer 112, exacerbating the difficulty in explaining the construction of the layers that terminate adjacent "gap 113."

Applicant finds it amazing that the Final Rejection can simultaneously allege that Harada is enabled and that certain claims of the present application are not.

2. The Alleged Anticipation of Claims 21-23 and 27-29 by U.S. Patent No. 5,757,573 to Tokuyama et al. ("Tokuyama")

Claims 21-23 and 27-29 stand rejected under 35 U.S.C. §102(b) as being anticipated by Tokuyama. The Final Rejection states:

> Claims 21-23 and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Tokuyama et al. (US 5,57,573).
>
> As per claims 1 and 20, Tokuyama et al. (US 5,57,573) discloses a device (e.g., FIG. 1) for reading or writing information (to a disk (1)), the device comprising: an electromagnetic transducer (2) including a plurality of solid transducer layers (as is necessarily required), a substrate (30) see, *inter alia*, COL. 12, lines 52-63- adjoining said transducer, said substrate (30) shaped as a rigid body (portion of slider that is the air bearing and is not flexed as seen, e.g., in FIGS. 5 and/or 6 and/or 7 and/or 23 and/or 24, etc.) adjacent to said transducer (2) and as a plurality of flexible elements (plurally divided portions of (30) which flexes as seen, e.g., in FIGS. 23, 24, etc.) distal to said transducer, and an actuator (12) (actuation means as per claim 20) attached to said substrate (30) distal to said transducer (2).
>
> As per claim 21 and 27, wherein said flexible elements extend substantially parallel to a first plane and said transducer layers (e.g., see vertical-to-air-bearing-surface orientation in FIGS. 22 and 23) are substantially parallel to a second plane that is perpendicular to said first plane.
>
> As per claims 22 and 28, wherein said transducer layers include a plurality of active layers (e.g., the requisite and inherently required poles of transducer (2)) that convert a magnetic signal to an electrical signal, said active layers separated from said substrate (30) by a plurality of inactive layers (e.g., the insulative layers that form the substrate and/or requisite transducing gap fringing layer of head (2)) is the substrate that do not convert between magnetic and electrical signals.
>
> As per claims 23 and 29, wherein no part of said substrate (30) is disposed further than said transducer (2) from said actuator (12).

Initially note that the Final Rejection only rejected claims 21-23 and 27-29 as allegedly being anticipated by Tokuyama, and begins by discussing claims 1 and 20. In a similar manner, applicant's response begins by discussing claims 1 and 20, even though claims 1 and 20 have not been rejected.

Regarding claim 1, applicant respectfully asserts that Tokuyama does not disclose "a microactuator," as recited in amended claim1. Instead, actuator 12 of Tokuyama appears to be a conventional rotary actuator. In addition, applicant respectfully disagrees that Tokuyama discloses "an actuator (12) ... attached to said substrate (30) distal to said

transducer (2)." Applicant respectfully asserts that "actuator 12" is not attached to "support 3" or "suspension 30."

Claim 20 in part recites "actuation means for positioning said transducer." Applicant respectfully asserts that "actuation means 12" does not teach the structure disclosed in appellants' specification corresponding to the "means-plus-function" clause in claim 20. Instead, actuator 12 of Tokuyama appears to be a conventional rotary actuator. In addition, applicant respectfully asserts that "actuator 12" as shown in FIG. 1 is not attached to "support 3" or "suspension 30."

Regarding both claims 1 and 20, applicant respectfully disagrees with the Final Rejection statement that Tokuyama discloses "a plurality of solid transducer layers (as is necessarily required)." As noted on page 3 of applicant's Request for Reconsideration filed December 3, 2003, a transducer can be formed with an iron core mounted on the trailing end of a slider. Moreover, as stated on page 3 of that Request for Reconsideration:

> A horseshoe magnet wound with a coil of wire will operate as suggested by the Final Rejection, and only includes a single layer. Moreover, perpendicular recording does not require more than one pole layer, although often a return pole layer is included. For example, U.S. Patent No. 4,286,299 to Shirahata et al. teaches that a magnetic head may have a single magnetic core layer around which is wrapped a winding carrying the recording current for vertical magnetization.

Regarding claims 21 and 27, applicant respectfully disagrees with the Final Rejection assertion that Tokuyama discloses "a plurality of solid transducer layers (as is necessarily required)." Applicant respectfully asserts, as discussed above and in the Request for Reconsideration, that Tokuyama does not necessarily require "a plurality of solid transducer layers," and that so those layers are not inherent in Tokuyama. It is telling that the Examiner cannot point to those layers.

Regarding claims 22 and 28, applicant reiterates that Tokuyama does not necessarily require "a plurality of active layers," but acknowledges that "magnetic head 2" may be formed on an insulative layer of "support 3" or "suspension 30." Applicant asserts that "magnetic head 2" is not necessarily separated from the "support 3" or "suspension 30" by a plurality of inactive layers.

D. 35 U.S.C. §103

1. The Alleged Obviousness of Claims 2-4, 11-14, 17,19, 24 and 25 over Harada in view of IBM TDB

The Final rejection rejects claims 2-4, 11-14, 17,19, 24 and 25 under 35 U.S.C. §103(a) as being unpatentable over Harada in view of IBM Technical Disclosure Bulletin entitled "Piezoelectric Actuator for Small Hard Disk Drive," Vol. No 36, Iss. No. 2, pp. 379-380, published February 1, 1993 ("IBM TDB"). The Final rejection states:

> With regard to claims 2-4, 11 and 12, Harada et al. (JP 9-035230 A) remains silent with respect to the aforementioned actuator including a layer or layers of piezoelectric material (i.e., an electrorestrictive actuator as per claim 11).
>
> Such piezoelectric layers (as well as actuators used in the type of disk drive disclosed in Harada et al. (JP 9-035230)) are well known in the art, however.
>
> As just one example, IBM Technical Disclosure Bulletin entitled "Piezoelectric Actuator for Small Hard Disk Drive," Vol. No 36, Iss. No. 2, pp. 379-380, published February 1, 1993 (referred to hereinafter as IBM TDB), discloses a rotary type actuator used in an analogous type of disk drive as that of Harada et al. (JP 9-035230 A), wherein the corresponding actuator used within the IBM TDB includes a piezoelectric layer/layers (i.e., an electrorestrictive actuator) formed as part of a piezoelectric actuator, in lieu of the conventional type rotary actuator. The IBM TDB uses such a piezoelectric actuator in lieu of the conventional type rotary actuator in order to, *inter alia*, reduce access time, provide high shock resistance and reduce volume. See the last paragraph of page 1 of the IBM TDB.
>
> Additionally, as per claim 19, wherein the actuator of the IBM TDB includes means ("certain voltage applied to the piezo(s)" – see description of the IBM TDB), for providing electrical voltage to said piezoelectric i.e., electrorestrictive) actuator.
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> It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the piezoelectric actuator of the type disclosed by the IBM TDB, in lieu of the conventional actuator disclosed by Harada et al. (JP 9-035230 A).
>
> The rationale is as follows: one of ordinary skill in the art at the time of the invention was made would have been motivated to provide the piezoelectric actuator of the type disclosed by the IBM TDB, in lieu of the conventional actuator disclosed by Harada et al. (JP 9-035230 A) in order to, *inter alia*, reduce access time, provide high shock resistance and reduce volume. See the last paragraph of page 1 of the IBM TDB.

a. IBM TBD is Nonenabled

Like Harada, the IBM TDB cited by the Final rejection is nonenabled, albeit for different reasons. One problem with the IBM TDB is the requirement that, in order to expand and create torque as described in that disclosure, piezo A and the arms and other structure surrounding piezo A must be free to move, with only the pivot fixed. Therefore, there is nothing to prevent piezo A and the arms and other structure surrounding piezo A from rotating, instead of rotating the suspension. A similar reasoning can be applied to piezo B and its surrounding structure. Thus, one of ordinary skill in the art would expect the IBM TDB to provide some unknown and unpredictable amount of actuation to the head, thwarting the actuator's essential purpose of accessing specific tracks on the medium.

Note further that the "long stroke" actuation of IBM TDB is achieved by mechanical multiplication of the piezoelectric movement by a factor of one thousand. Stated differently, any error or inaccuracy in the long stroke actuator of the IBM TDB is multiplied by a factor of one thousand at the head, likely leading to intolerable errors. Even so, this long stroke actuation only achieves a maximum range of one centimeter, requiring at least two such long stroke actuators (along with additional actuators, suspensions and heads) for even the small disk surface shown. Note that even the "fine movement" actuation would multiply errors by a factor of twenty, and that both of these factors would multiply the unpredictable actuation discussed above.

Moreover, it is unclear how the limited long stroke actuation described in the IBM TDB would even allow the disk drive depicted in that disclosure to be fabricated. For example, while it may be possible for the head and suspension designed for interaction with the outer zone of the disk to be moved beyond the circumference of the disk to allow drive fabrication, this would presumably require even greater mechanical multiplication and greater errors. On the other hand, it is not at all clear how the head and suspension designed for interaction with the inner zone of the disk could be moved beyond the circumference of the disk during fabrication, as this would seem to require more than double the admittedly limited range of actuation provided.

In addition, the IBM TDB does not disclose, and it would not have been evident to one of ordinary skill in the art, how to write on and read from the other major surface

of the disk of that disclosure. Note that at least an additional pair of heads and suspensions would be needed for this essential feature of a modern disk drive, and each head and suspension would require an additional pair of actuators. Cramming the additional actuators on the same side of the disk as the actuators that are shown would seem to interfere with the additional heads and suspensions that would need to be located on that side of the disk. Reducing the size of the actuators in order to avoid such interference is contradicted by the meager large stroke motion provided by the actuators shown, which require mechanical multiplication of one thousand times in order to provide movement that, as discussed above, is still inadequate. In addition, attempts to reduce the actuator size would require greater mechanical multiplication and create even more errors.

Attempting to provide additional actuators on the opposite side of the disk from the actuators shown would exacerbate these difficulties. Placing the actuators in the corners directly across from the actuators shown would destroy the ability of all the original heads and suspensions as well as all the additional heads and suspensions to function, as the suspensions on each side would need to be in the same place as the actuators on the other side. On the other hand, placing the actuators in the corners across and ninety degrees from the actuators shown would destroy the functioning of both the original heads and suspensions designed for accessing the outer zone and the additional heads and suspensions designed for accessing the outer zone, as the outer heads and suspensions on each side would need to be in the same place as the actuators on the other side.

In addition, the inability of the head and suspension designed for interaction with the inner zone of the disk to be moved beyond the circumference of the disk during fabrication, as mentioned above, would make fabrication intractable should such an inner zone head and suspension be required for the other surface of the disk.

For at least the above reasons, the IBM TDB is nonenabled and is therefore not prior art that can be used in an obviousness rejection.

The Final Rejection on page 18 responds to the various reasons explained above as to why the IBM TDB is nonenabled by simply claiming, albeit "strenuously," that the IBM TDB is enabled. The Final Rejection, however, offers no answer to the various

reasons that were detailed by applicant in the prior response explaining why the IBM TDB would be recognized as unworkable by one of ordinary skill in the art.

b. One of Ordinary Skill Would Not Have Modified Harada with IBM TDB

Furthermore, *assuming arguendo* that the IBM TDB is somehow enabled, one of ordinary skill in the art would not have been motivated to provide the actuator of the IBM TDB in lieu of the conventional actuator of Harada due to the many problems the IBM TDB, as discussed above. In addition, even the attributes alleged by the IBM TDB would not have been believed by one of ordinary skill in the art. For example, the reduced volume allegedly offered by the IBM TDB is contradicted by the discussion above, which points out that the IBM TDB does not provide the possibility of storage on both sides of the disk, and so the IBM TDB requires an additional drive for the same amount of storage, increasing rather than reducing the volume. Similarly, the arms shown in Fig. 1 of the IBM TDB would need to be thin and therefore fragile to provide even the minimal actuation alleged at the low voltage levels of a disk drive, and the bending of those arms to allow for that minimal actuation would weaken the arms over time, decreasing rather than increasing shock resistance.

Moreover, the combination of large errors despite limited actuation would have dissuaded one of ordinary skill in the art from employing the IBM TDB in a disk drive, which is perhaps the reason the IBM TDB was apparently never fabricated, used or even considered worthy of a patent application. As noted in *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992): "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." Of course, due to the many problems of Harada, some of which are discussed above, one of ordinary skill would not have looked to Harada in the first place.

With regard to claims 3 and 13, the Final rejection states:

> Moreover still, as per claims 3 and 13, the resulting combination of the piezoelectric actuator as taught and explicitly suggested by the IBM TDB, as applied to Harada et al. (JP 9-035230 A), would provide horizontally disposed piezoelectric layers as depicted in the FIGS. of the

IBM TDB which would be "substantially parallel" with the horizontal layers of the transducer (e.g., the upper and lower core layers (112) which constitute part of the induction head - see FIG. 3 of Harada et al. (JP 9-035230 A)).

As noted above, neither Harada nor the IBM TDB are enabled, and both Harada and the IBM TDB provide disincentives that would have dissuaded one of ordinary skill in the art from making the combination proposed by the Final rejection. As such, the piezoelectric layers of the IBM TDB would not be "substantially parallel" with the horizontal layers of the transducer of Harada, because the two would not have been combined in one device.

2. The Alleged Obviousness of Claim 6 over Harada in view of Japan Patent JP 06-176517 A to Endo ("Endo")

With regard to claim 6, the Final Rejection on page 11 states:

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. (JP 9-035230 A) in view of Endo (JP 06-176517 A).

See the discussion of Harada et al. (JP 9-035230 A), *supra.*

With regard to claim 6, Harada et al. (JP 9-035230 A) does not explicitly show wherein said flexible elements are substantially aligned with a center of mass of said rigid body (i.e., the slider).

Endo (JP 06-176517 A), however, disclose wherein a support suspension portion of the flexure end of a suspension is absorbed into a slider (i.e., rigid body), in order to, inter alia, shorten the distance against the surface of the magnetic disk (i.e., by reducing the Z-height) and to further provide stable support of the slider by positioning such flexure(s) adjacent the center of mass of the rigid body.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the teaching of a suspension end flexure support provided as being substantially aligned with a center of mass of the rigid body of Harada et al. (JP 9-035230 A), as explicitly taught and suggested by Endo (JP 06-176517 A)..

The rationale is as follows: one of ordinary skill in the art at the time of the invention was made would have been motivated to provide the teaching of a suspension end flexure support provided as being substantially aligned with a center of mass of the rigid body of Harada et al. (JP 9-035230 A), as explicitly taught and suggested by Endo (JP 06-176517 A) in order to, shorten the distance against the surface of the magnetic disk (i.e., by reducing the Z-height) and to further provide stable support of the slider by positioning such flexure(s) adjacent the center of mass of the rigid body.

Applicant respectfully disagrees with the Final Rejection assertion that 'it would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the teaching of a suspension end flexure support provided as being substantially aligned with a center of mass of the rigid body of Harada, as explicitly taught and suggested by Endo (JP 06-176517 A). Initially note that the Final Rejection does not even assert a case of obviousness of claim 6, instead alleging that it "would have been obvious ... to provide the teaching of..." Perhaps this is because Endo involves a suspension that is fitted into a groove of the slider whereas Harada claims to have gimbals that are located to the side of the slider, and there is no evident way to reconcile these opposite approaches. As mentioned above, the Final Rejection provides no suggestion as to how providing the teaching of Endo would accomplish the device defined in claim 6.

In response to this argument, the Final Rejection on page 19 essentially reiterates the rejection quoted above, but rephrases the allegation of obviousness to state:

> It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the teaching of a suspension end flexure support provided as being substantially aligned with a center of mass of the rigid body of Harada et al. (JP 9-035230 A), as explicitly taught and suggested by Endo (JP 06-176517 A) in order to, shorten the distance against the surface of the magnetic disk (i.e., by reducing the Z-height) and to further provide stable support of the slider by positioning such flexure(s) adjacent the center of mass of the rigid body.

As noted above, Harada does not enable one of ordinary skill to make a workable device, and Harada would not be enabled by somehow substantially aligning elements with a center of mass. As a related issue, it is very unclear how this proposed feature of Harada would be accomplished.

With regard to claim 18, the Final rejection states:

> Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. (JP 9-035230) and IBM Technical Disclosure Bulletin entitled "Piezoelectric Actuator for Small Hard Disk Drive," Vol. No 36, Iss. No. 2, pp. 379-380, published February 1, 1993, as applied to claim 11 above, and further in view of Fukuoka (JP 09-148639 A).
>
> ...

As discussed above, both Harada and the IBM TDB are nonenabled and provide disincentives rather than motivation to make the combination proposed in the Final rejection. Fukuoka (JP 09-148639 A; "Fukuoka") teaches prevention of deformation of an inner electrode layer by adding silicon nitride. The IBM TDB, however, does not teach where an electrode is to be located, and so it is not clear that deformation of an electrode would be a problem. Instead, because the IBM TDB requires deformation of piezo A and the arms and other structure surrounding piezo A, one of ordinary skill in the art would not have modified the proposedly combined Harada and the IBM TDB with Fukuoka as proposed by the Final rejection.

D. The Alleged Obviousness of Claims 24-26 as Obvious Over Tokuyama in view of IBM TDB

The Final Rejection, after removal of some repetitive statements, alleges:

> With regard to claim 11 (which is the basis of newly presented rejected claims 24-26), Tokuyama et al. (US 5,57,573) remains silent with respect to the aforementioned actuator including a layer or layers of piezoelectric material (i.e., an electrorestrictive actuator as per claim 11).
>
> ...
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the piezoelectric actuator of the type disclosed by the IBM TDB, in lieu of the conventional actuator disclosed by Tokuyama et al. (US 5,57,573) in order to, inter alia, reduce access time, provide high shock resistance and reduce volume. See the last paragraph of page 1 of the IBM TDB.

As discussed above, the IBM TDB is nonenabled, and provides multiple reasons why one of ordinary skill in the art would not have looked to it to modify a working device, as the resulting device would likely be inoperable. Applicant respectfully asserts that one of such skill would have looked beyond the self-laudatory advantages claimed by the IBM TDB (some of which are facially untrue, as explained above) to realize its serious disadvantages, and for that reason would not have been incented to provide the piezoelectric actuator of the type disclosed by the IBM TDB, in lieu of the conventional actuator disclosed by Tokuyama.

In addition, *assuming arguendo* that one of such skill would have made the substitution proposed by the Final Rejection and *assuming arguendo* that the resulting

device would be operable, Tokuyama as proposedly modified would have substantial nonobvious differences from claim 11. For example, Tokuyama as proposedly modified would not have "a wafer substrate piece disposed between an electromagnetic transducer and an electrostrictive actuator," in contrast to claim 11. Moreover, Tokuyama as proposedly modified would not have "said substrate piece shaped as a rigid body adjoining said transducer and as a flexible element connecting said rigid body and said actuator," in contrast to claim 11.

E. Reply to Examiner's Response

Beginning on page 17 the Final Rejection provides a "***Response to Arguments***." Applicant has already replied to some of the comments in this response, and replies to the remainder here. At the outset, the Examiner states that he is applying the term "adjoining" as he states the CAFC has interpreted it in a different case. According to the Examiner, the CAFC effectively stated that the term "adjoining" was to be interpreted as "contacting."

Applicant respectfully disagrees with the Examiner's stance, as discussed in applicant's prior response, which will not be repeated at this stage. Suffice it to say that applicant believes that the Examiner has flip-flopped between two extremes in his interpretation, while avoiding the more reasonable middle ground.

The Final Rejection on page 18 states that "the test for obviousness is not whether the features of one reference may be bodily incorporated into the other to produce the claimed subject matter, but simply what the combination of references makes obvious to one of ordinary skill in the art."

Applicant respectfully notes that the test for obviousness has been phrased in different ways by different courts. For example, "teaching away" is considered to be strong evidence of nonobviousness, and one example of teaching away occurs when the reference, as proposedly combined or modified, is inoperable. Applicant also notes that the references must suggest the combination or modification proposed, and that disadvantages of a proposed combination or modification must be weighed against its purported advantages to determine whether an incentive to make the proposed combination or modification existed. Applicant respectfully asserts in this regard that

one of ordinary skill in the art would have taken the cited references' self-laudatory claims of advantages with a grain of salt, and would have found them overwhelmed by the technical disincentives described above.

III. Conclusion

Applicant has responded to each of the items of the Final rejection, and has explained why the Final rejection has not presented a prima facie case of anticipation or obviousness for any of the claims. As such, applicant respectfully asserts that the application is in condition for allowance, and a notice of allowance is solicited.

Respectfully submitted,

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: MS AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on September 6, 2005.

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